Wireless 2-Gang Water Leak Detector

R718WA2
User Manual

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1. Introduction

This device is an alarm device for 2-way leak detection. When the water sensor detects a leak, it will send an alarm message to the gateway. When the water sensor detects that there is no water leak again, it will send a back to normal status message to the gateway, which uses the SX1276 wireless communication module.

LoRa Wireless Technology:

LoRa is a wireless communication technology dedicated to long distance and low power consumption. Compared with other communication methods, LoRa spread spectrum modulation method greatly increases to expand the communication distance. Widely used in long-distance, low-data wireless communications. For example, automatic meter reading, building automation equipment, wireless security systems, industrial monitoring. Main features include small size, low power consumption, transmission distance, anti-interference ability and so on.

LoRaWAN:

LoRaWAN uses LoRa technology to define end-to-end standard specifications to ensure interoperability between devices and gateways from different manufacturers.

2. Appearance

3. Main Features

- Adopt SX1276 wireless communication module
- 2 ER14505 battery AA SIZE (3.6V / section) parallel power supply
- Can detect two voltage values and two water leakage status
- The base is attached with a magnet that can be attached to a ferrous object
- Protection class: Main body IP65/IP67 (optional), Sensor IP67
- Compatible with LoRaWAN™ Class A
- Frequency hopping spread spectrum
- Configuration parameters can be configured via a third-party software platform, data can be read and alarms can be set via SMS text and email (optional)
- Applicable to third-party platforms: Actility/ThingPark, TTN, MyDevices/Cayenne
- Low power consumption and long battery life

Note:

Battery life is determined by the sensor reporting frequency and other variables, please refer to

http://www.netvox.com.tw/electric/electric_calc.html

On this website, users can find battery life of various models in different configurations.

4.Set up Instruction

On/Off

Power on	Insert batteries. (users may need a flat blade screwdriver to open)
Turn on	Press and hold the function key for 3 seconds till the green indicator flashes once.
Turn off (Restore to factory setting)	Press and hold the function key for 5 seconds till the green indicator flashes for 20 times.
Power off	Remove Batteries.
Note	1. Remove and insert the battery; the device is at off state by default. Press and hold the function key for 3 seconds till the green indicator flashes once to turn on the device. 2. On/off interval is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components. 3. At 1st -5th second after power on, the device will be in engineering test mode.

Network Joining

Never joined the network	Turn on the device to search the network to join the network. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Had joined the network (not at factory setting mode)	Turn on the device to search the previous network to join the network. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Fail to join the network (when the device is on)	Suggest to check the device verification information on the gateway or consult your platform server provider.

Function Key

Press and hold for 5 seconds	Restore to factory setting / Turn off The green indicator flashes for 20 times: success The green indicator remains off: fail
Press once	The device is in the network: the green indicator flashes once and sends a report The device is not in the network: the green indicator remains off

Sleeping Mode

The device is on and in the network	Sleeping period: Min Interval. When the reportchange exceeds setting value or the state changes: send a data report according to Min Interval.

Low Voltage Warning

Low Voltage	3.2V

5. Data Report

The device will immediately send a version package Report and a report data with leak detection status and voltage value.

The device sends data in the default configuration before any configuration is done.

Default setting:

Max Time: 60min

Min Time: 60min (by default, the current voltage value is detected every Min Interval)

Battery Voltage Change: 0x01 (0.1V)

Note:

The data sending cycle will be programmed before shipment.

The interval between two reports must be the minimum time

Water leak detection:

When the leak sensor is immersed in water, it will immediately issue a report, leaking status:1.

When the leak sensor is out of the immersion state, a report is issued immediately, with no water leakage status: 0.

The data can be decoded by the Netvox LoRaWAN Application Command document and

http://www.netvox.com.cn:8888/page/index

Data report configuration and sending period are as following:

Min. Interval (Unit:second)	Max. Interval (Unit:second)	Reportable Change	Current Change≥ Reportable Change	Current Change＜ Reportable Change
Any number between 1~65535	Any number between 1~65535	Can not be 0.	Report per Min. Interval	Report per Max. Interval

5.1 Example of ReportDataCmd

FPort：0x06

Bytes	1	1	1	Var(Fix=8 Bytes)
	Version	DeviceType	ReportType	NetvoxPayLoadData

Version– 1 byte –0x01——the Version of NetvoxLoRaWAN Application Command Version

DeviceType– 1 byte – Device Type of Device

The devicetype is listed in Netvox LoRaWAN Application Devicetype doc

ReportType – 1 byte –the presentation of the NetvoxPayLoadData，according the devicetype

NetvoxPayLoadData– Fixed bytes (Fixed =8bytes)

Device	**DeviceType**	**ReportType**	**NetvoxPayLoadData**			
R718WA2	0x46	0x01	Battery (1Byte, unit:0.1V)	WaterLeak 1 (1Byte 0:noLeak1:Leak)	WaterLeak2 (1Byte 0:noLeak1:Leak)	Reserved (5Bytes,fixed 0x00)

Uplink: 0146012200010000000000

Byte	**Value**	**Attribute**	**Result**	**Resolution**
1st	01	Version	1	-
2nd	46	DeviceType	46	-
3rd	01	ReportType	1	-
4th	22	Battery	3.4v	22(HEX)=34(DEC),34*0.1v=3.4v
5th	00	Water1Leak	noleak	-
6th	01	Water2Leak	leak	-
7th~11th	0000000000	Reserved	-	-

5.2 Example of ConfigureCmd

FPort：0x07

Bytes	1	1	Var (Fix =9 Bytes)
	CmdID	DeviceType	NetvoxPayLoadData

CmdID– 1 byte

DeviceType– 1 byte – Device Type of Device

NetvoxPayLoadData– var bytes (Max=9bytes)

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData			
Config ReportReq	R718WA2	0x01	0x46	MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	BatteryChange (1byte Unit:0.1v)	Reserved (4Bytes,Fixed 0x00)
Config ReportRsp		0x81		Status (0x00_success)		Reserved (8Bytes,Fixed 0x00)	
ReadConfig ReportReq		0x02		Reserved (9Bytes,Fixed 0x00)			
ReadConfig ReportRsp		0x82		MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	BatteryChange (1byte Unit:0.1v)	Reserved (4Bytes,Fixed 0x00)

1. Configure device parameters MinTime = 1min, MaxTime = 1min, BatteryChange = 0.1v

   Downlink: 0146003C003C0100000000

   The device returns:

   81460000000000000000 (configuration is successful)

   81460100000000000000 (configuration is failed)

2. Read device configuration parameters

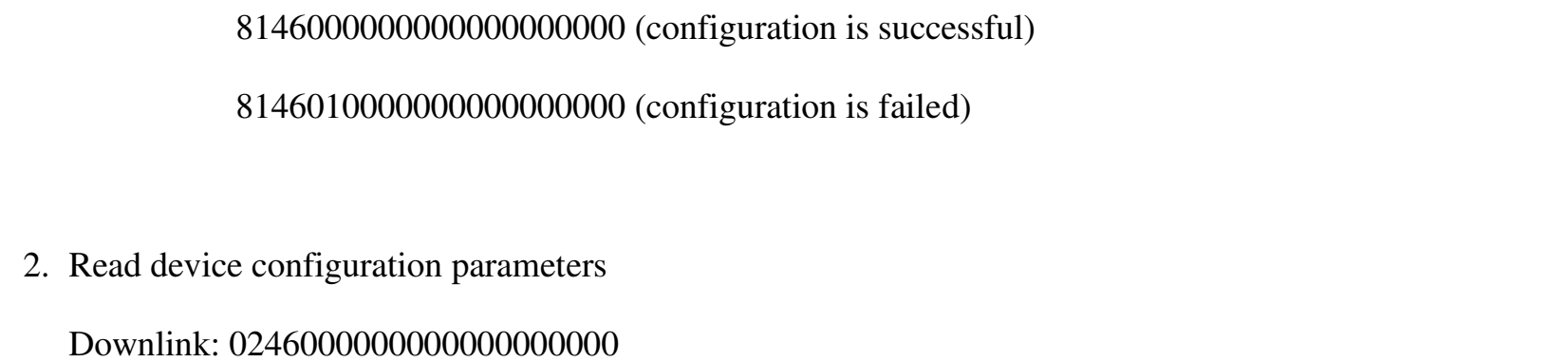
   Downlink: 02460000000000000000

   The device returns:

   8246003C003C0100000000 (device current configuration parameter)

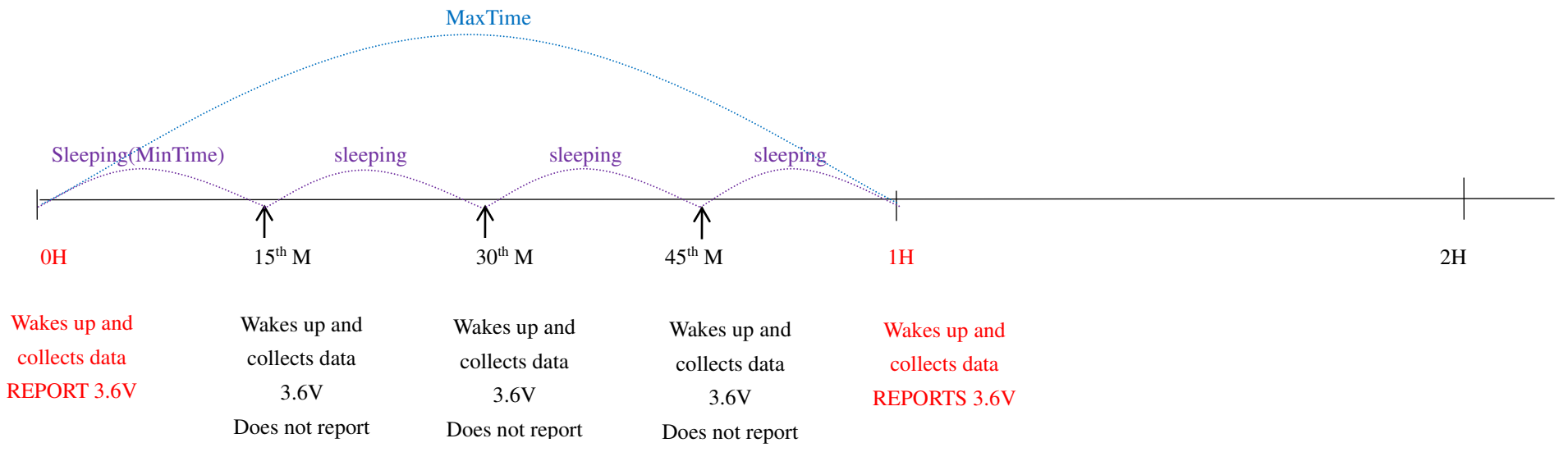
5.3 Example for MinTime/MaxTime logic

Example#1 based on MinTime = 1 Hour, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange=0.1V

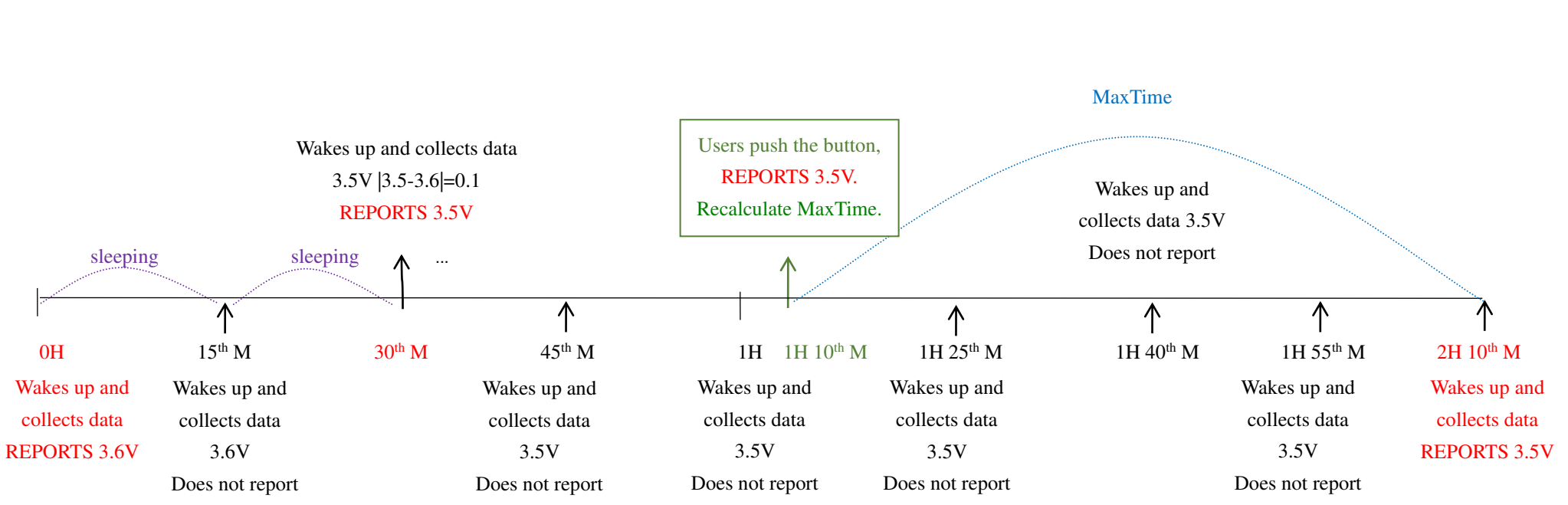


Note: MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless BatteryVoltageChange value.

Example#2 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange= 0.1V.



Example#3 based on MinTime = 15 Minutes, MaxTime= 1 Hour, Reportable Change i.e. BatteryVoltageChange= 0.1V.


MaxTime
Wakes up and collects data 3.5V |3.5-3.6|=0.1 REPORTS 3.5V
Users push the button, REPORTS 3.5V. Recalculate MaxTime.
Wakes up and collects data 3.5V Does not report
sleeping
sleeping
...
0H
15th M
30th M
45th M
1H
1H 10th M
1H 25th M
1H 40th M
1H 55th M
2H 10th M
Wakes up and collects data REPORTS 3.6V
Wakes up and collects data 3.6V Does not report
Wakes up and collects data 3.5V Does not report
Wakes up and collects data 3.5V Does not report
Wakes up and collects data 3.5V Does not report
Wakes up and collects data 3.5V Does not report
Wakes up and collects data 3.5V Does not report
Wakes up and collects data REPORTS 3.5V

Notes:

1) The device only wakes up and performs data sampling according to MinTime Interval. When it is sleeping, it does not collect data.
2) The data collected is compared with the last data reported. If the data variation is greater than the ReportableChange value, the device reports according to MinTime interval. If the data variation is not greater than the last data reported, the device reports according to MaxTime interval.
3) We do not recommend to set the MinTime Interval value too low. If the MinTime Interval is too low, the device wakes up frequently and the battery will be drained soon.
4) Whenever the device sends a report, no matter resulting from data variation, button pushed or MaxTime interval, another cycle of MinTime/MaxTime calculation is started.

6. Installation

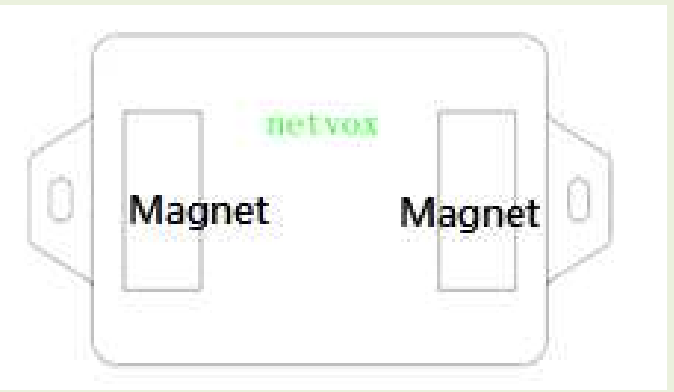
This product comes with waterproof function. When using it, the back of it can be adsorbed on the iron surface, or the two ends can be fixed to the wall with screws.

Note: To install the battery, use a screwdriver or similar tool to assist in opening the battery cover.

1. The Wireless 2-Gang Water Leak Detector (R718WA2) has a built-in magnet (as Figure 1 below). When installed, it can be attached to the surface of an object with iron which is convenient and quick.

   To make the installation more secure, use screws (purchased) to secure the unit to a wall or other surface (as Figure 2 below).

   Note: Do not install the device in a metal shielded box or in an environment with other electrical equipment around it to avoid affecting the wireless transmission of the device.



2. Tear off the 3M glue at the bottom of the sensor probe and stick it on the flat ground where water leakage may accumulate.

   As shown in the enlarged picture on the right:

3. When the sensor probe detects water leakage, the water leakage detector device will send "alarm" information. Remove the probe from the accumulated water leakage position, and dry the remaining water in the sensor. The device returns to the "normal" state and sends the "normal" state information.

Wireless 2-Gang Water Leak Detector (R718WA2) could be applied to the following scenarios:

- Data center and engine room
- Document storage center
- Basement water leakage monitoring
- Water pipe leakage detection
- Bilge monitoring

The device is designed to detect water leakage and is not suitable for detecting harmful chemicals, solvents, oils, fuels, strong acids or other corrosive liquids.

*Take R718WA (single way) as the schematic diagram

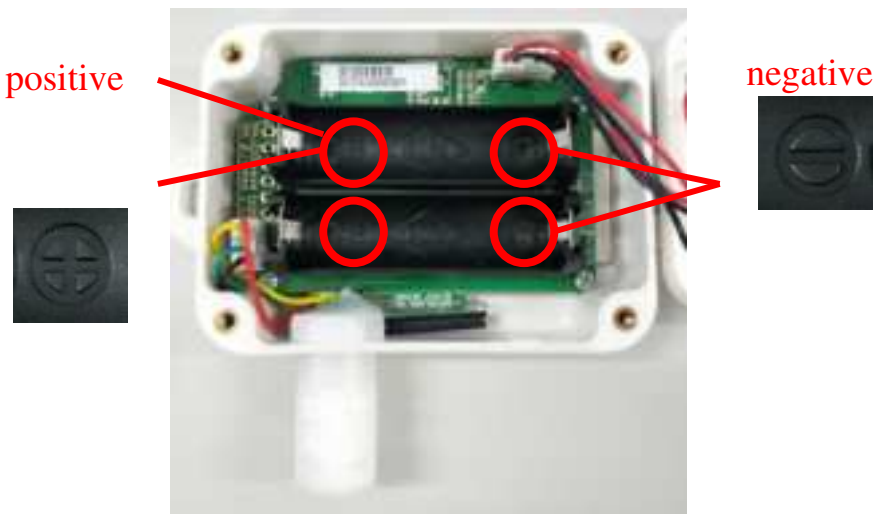
Battery installation steps (Take R718A as the schematic diagram)

Please replace the battery by professionals! The device must use 2 sections of ER14505 battery (3.6V/section)

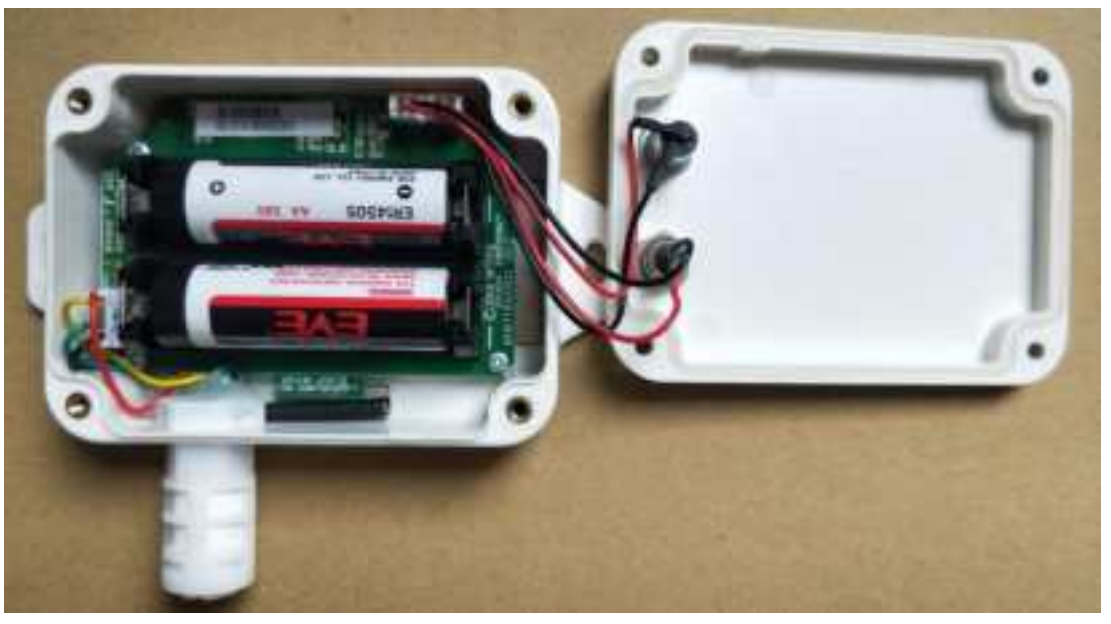
Please note that the positive and negative poles of the battery should not be installed reversely.

Step 1: Unscrew the four corners of the device with a screwdriver, as shown in the red circle below.

Step 2: Put the batteries into the battery bay of the device and note the positive and negative poles of the battery, please do not insert the battery reversely.



Step 3: After inserting the batteries, put the lid back on and tighten the four screws.



Note:

Please do not disassemble the device unless it is required to replace the batteries.

Do not touch the waterproof gasket, LED indicator light, function keys when replacing the batteries. Please use suitable screwdriver to tighten the screws (if using an electric screwdriver, it is recommended to set the torque as 4kgf) to ensure the device is impermeable.

7. Information about Battery Passivation

Many of Netvox devices are powered by 3.6V ER14505 Li-SOCl2 (lithium-thionyl chloride) batteries that offer many advantages including low self-discharge rate and high energy density.

However, primary lithium batteries like Li-SOCl2 batteries will form a passivation layer as a reaction between the lithium anode and thionyl chloride if they are in storage for a long time or if the storage temperature is too high. This lithium chloride layer prevents rapid self-discharge caused by continuous reaction between lithium and thionyl chloride, but battery passivation may also lead to voltage delay when the batteries are put into operation, and our devices may not work correctly in this situation.

As a result, please make sure to source batteries from reliable vendors, and it is suggested that if the storage period is more than one month from the date of battery production, all the batteries should be activated.

If encountering the situation of battery passivation, users can activate the battery to eliminate the battery hysteresis.

ER14505 Battery Passivation:

7.1 To determine whether a battery requires activation

Connect a new ER14505 battery to a resistor in parallel, and check the voltage of the circuit.

If the voltage is below 3.3V, it means the battery requires activation.

7.2 How to activate the battery

a. Connect a battery to a resistor in parallel

b. Keep the connection for 5~8 minutes

c. The voltage of the circuit should be ≧3.3, indicating successful activation.

Brand	Load Resistance	Activation Time	Activation Current
NHTONE	165 Ω	5 minutes	20mA
RAMWAY	67 Ω	8 minutes	50mA
EVE	67 Ω	8 minutes	50mA
SAFT	67 Ω	8 minutes	50mA

Note:

If you buy batteries from other than the above four manufacturers, then the battery activation time, activation current, and required load resistance shall be mainly subject to the announcement of each manufacturer.

8. Important Maintenance Instruction

Kindly pay attention to the following in order to achieve the best maintenance of the product:

• Keep the device dry. Rain, moisture, or any liquid might contain minerals and thus corrode electronic circuits. If the device gets wet, please dry it completely.

• Do not use or store the device in dusty or dirty environment. It might damage its detachable parts and electronic components.

• Do not store the device under excessive heat condition. High temperature can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.

• Do not store the device in places that are too cold. Otherwise, when the temperature rises to normal temperature, moisture will form inside, which will destroy the board.

• Do not throw, knock or shake the device. Rough handling of equipment can destroy internal circuit boards and delicate structures.

• Do not clean the device with strong chemicals, detergents or strong detergents.

• Do not apply the device with paint. Smudges might block in the device and affect the operation.

• Do not throw the battery into the fire, or the battery will explode. Damaged batteries may also explode.

All of the above applies to your device, battery and accessories. If any device is not working properly, please take it to the nearest authorized service facility for repair.